



## A5N:1000.XXH

### VOLTAGE RATINGS

Part Number	Max. rep. peak reverse voltage		Max. non-rep. peak reverse voltage
	$T_J = 0$ to $125^\circ\text{C}$	$T_J = -40$ to $0^\circ\text{C}$	
A5N:1000.22H	2200	2200	2300
A5N:1000.24H	2400	2400	2500
A5N:1000.26H	2600	2600	2700
A5N:1000.28H	2800	2800	2900
A5N:1000.30H	3000	3000	3100
A5N:1000.32H	3200	3200	3300

### MAXIMUM ALLOWABLE RATINGS

PARAMETER	VALUE	UNITS	NOTES
$T_J$ Junction Temperature	-40 to 125	$^\circ\text{C}$	-
$T_{\text{stg}}$ Storage Temperature	-40 to 150	$^\circ\text{C}$	-
$I_{T(\text{AV})}$ Max. Av. current @ Max. $T_c$	1000	A	180° half sine wave
	74	$^\circ\text{C}$	
$I_{T(\text{RMS})}$ Nom. RMS current	1600	A	-
$I_{T(\text{SM})}$ Max. Peak non-rep. surge current	14000	A	50 Hz half cycle sine wave
	15000		60 Hz half cycle sine wave
$I^2t$ Max. $I^2t$ capability	937000	$\text{A}^2\text{s}$	$t = 10\text{ms}$ Initial $T_J = 125^\circ\text{C}$ , rated $V_{\text{RRM}}$ applied after surge.
	973000		$t = 8.3 \text{ ms}$
$I^{2\text{1/2}}$ Max. $I^{2\text{1/2}}$ capability	46700	$\text{kA}^2\text{s}^{1/2}$	Initial $T_J = 125^\circ\text{C}$ , no voltage applied after surge. $I^2t$ for time $t_x = I^{2\text{1/2}} * t_x^{1/2}$ . ( $0.1 < t_x < 10\text{ms}$ ).
di/dt Max. Non-repetitive rate-of-rise current	300	$\text{A}/\mu\text{s}$	$T_J = 125^\circ\text{C}$ , $V_D = V_{\text{DRM}}$ , $I_{\text{TM}} = 3000\text{A}$ . Gate pulse: 20V, $20\Omega$ , approximately 40% of non-repetitive value.
$P_{\text{GM}}$ Max. Peak gate power	200	W	$t_p = 40 \mu\text{s}$
$P_{G(\text{AV})}$ Max. Av. gate power	5	W	-
$+I_{\text{GM}}$ Max. Peak gate current	10	A	-
$-V_{\text{GM}}$ Max. Peak negative gate voltage	5	V	-
F Mounting Force	24500(5500) $\pm 10\%$	N(Lbf)	-



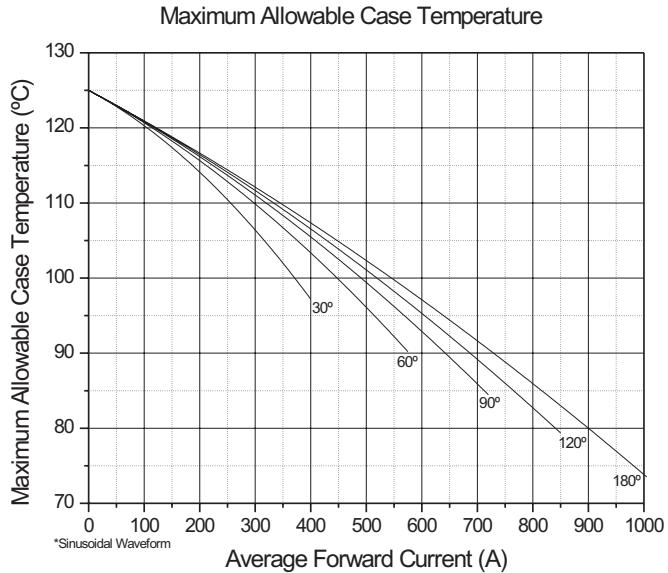
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### CHARACTERISTICS

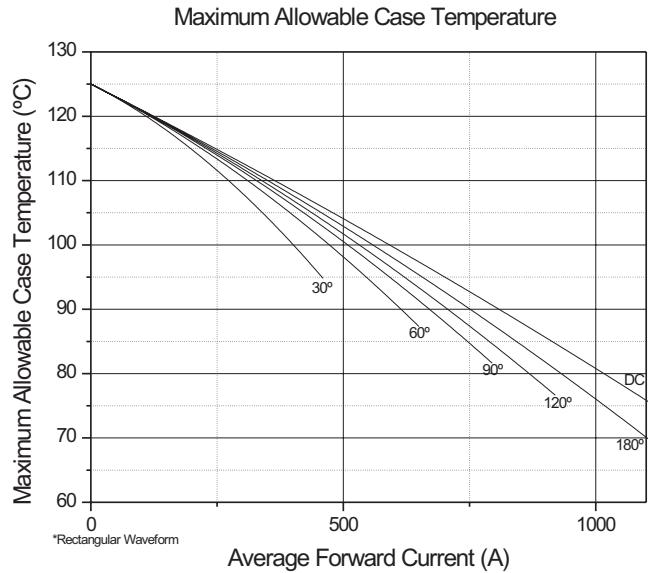
PARAMETER	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
$V_{TM}$ peak on-state voltage	---	---	2.26	V	Initial $T_J = 25^\circ\text{C}$ , 50-60Hz half sine, $I_{peak} = 3000\text{A}$ .
$V_{F(TO)1}$ Low-level threshold	---	---	1.31	V	$T_J = 125^\circ\text{C}$
$V_{F(TO)2}$ High-level threshold	---	---	1.55		Av. power = $V_{T(TO)} * I_{T(AV)} + r_T * [I_{T(RMS)}]^2$ , 180 Half Sine.
$r_T$ Low-level resistance	---	---	0.48	$\text{m}\Omega$	Use low values for $I_{TM} < \pi$ rated $I_{T(AV)}$
$r_T$ High-level resistance	---	---	0.38		
$I_L$ Latching current	---	---	800	mA	$T_C = 125^\circ\text{C}$ , 12V anode. Gate pulse: 10V, $20\Omega$ , $100\mu\text{s}$ .
$I_H$ Holding current	---	---	400	mA	$T_C = 25^\circ\text{C}$ , 12V anode. Initial $I_T = 15\text{A}$ .
$t_d$ Delay time	---	0.7	1.5	$\mu\text{s}$	$T_C = 25^\circ\text{C}$ , $V_D$ = rated $V_{DRM}$ , 50A resistive load. Gate pulse: 10V, $20\Omega$ , $20\mu\text{s}$ , $0.1\mu\text{s}$ rise time.
$t_q$ Turn-off time	---	125	250	$\mu\text{s}$	$T_J = 125^\circ\text{C}$ , $I_{TM} = 1000\text{A}$ , $di/dt = 25\text{A}/\mu\text{s}$ , $V_R = -50\text{V}$ . $dv/dt = 20\text{V}/\mu\text{s}$ lin. To 80% rated $V_{DRM}$ . Gate: 0V, $100\Omega$ .
$t_{q(diode)}$ Turn-off time with feedback diode	---	---	50	$\mu\text{s}$	$T_J = 125^\circ\text{C}$ , $I_{TM} = 1000\text{A}$ , $di/dt = 25\text{A}/\mu\text{s}$ , $V_R = 1\text{V}$ . $dv/dt = 600\text{V}/\mu\text{s}$ lin. To 40% rated $V_{DRM}$ . Gate: 0V, $100\Omega$ .
$I_{RM(REC)}$ Recovery current	---	93	---	A	$T_J = 125^\circ\text{C}$ , $I_{TM} = 1000\text{A}$ , $diR/dt = 25\text{A}/\mu\text{s}$ .
$Q_{RR}$ Recovered charge	---	166	---	$\mu\text{C}$	
dv/dt Critical rate-of-rise of off-state voltage	300	---	1000	$\text{V}/\mu\text{s}$	$T_J = 125^\circ\text{C}$ . Exp. to 100% or lin. Higher $dv/dt$ values To 80% $V_{DRM}$ , gate open. available.
	---	---	300		$T_J = 125^\circ\text{C}$ , Exp. To 67% $V_{DRM}$ , gate open.
$I_{RM}$ , $I_{DM}$ Peak reverse and off-state current	---	15	75	mA	$T_J = 125^\circ\text{C}$ , Rated $V_{RRM}$ and $V_{DRM}$ , gate open.
$I_{GT}$ DC gate current to trigger	---	40	300	mA	$T_C = -40^\circ\text{C}$
	---	20	150		$T_C = 25^\circ\text{C}$ +6V anode-to-cathode. For recommended gate
$V_{GT}$ DC gate voltage to trigger	0.3	---	5	V	$T_C = -40^\circ\text{C}$ drive see "Gate Characteristics" figure.
	0.3	---	3		$T_C = 25^\circ\text{C}$
$V_{GD}$ DC gate voltage not to trigger	---	---	0.200	V	$T_C = 25^\circ\text{C}$ , Max. Value which will not trigger with rated $V_{RRM}$ anode-to-cathode.
$R_{thJC}$ Thermal resistance, junction-to-case	---	---	0.025	$^\circ\text{C}/\text{W}$	DC operation, double side cooled.
	---	---	0.025	$^\circ\text{C}/\text{W}$	180° sine wave, double side cooled.
	---	---	0.027	$^\circ\text{C}/\text{W}$	120° rectangular wave, double side cooled.
$R_{thCS}$ Thermal resistance, case-to-sink	---	---	0.010	$^\circ\text{C}/\text{W}$	Mtg. Surface smooth, flat and greased. Single side cooled. For double side, divide by 2.
wt Weight	---	460(16.0)	---	g(oz.)	---
Case Style	---	TO-200AD	JEDEC		---



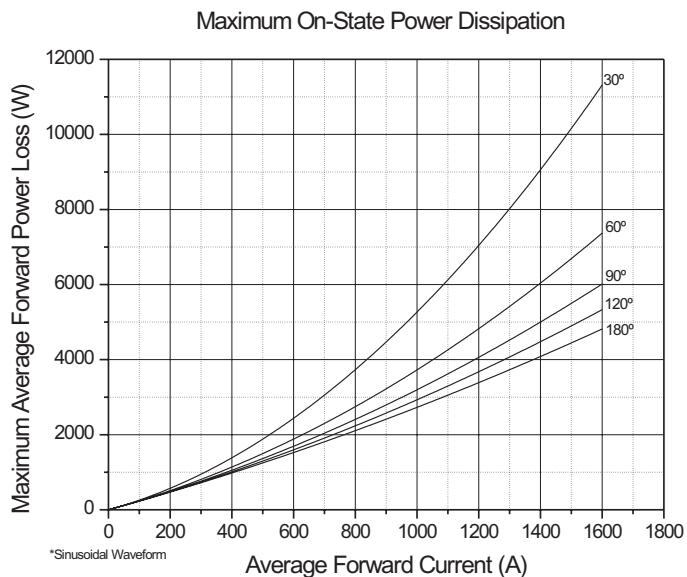
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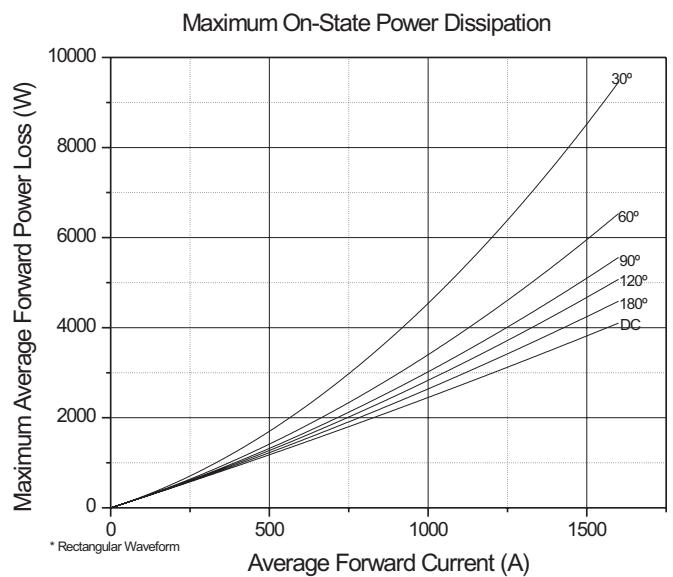
**Fig. 1 - Current Ratings Characteristics**



**Fig. 2 - Current Ratings Characteristics**



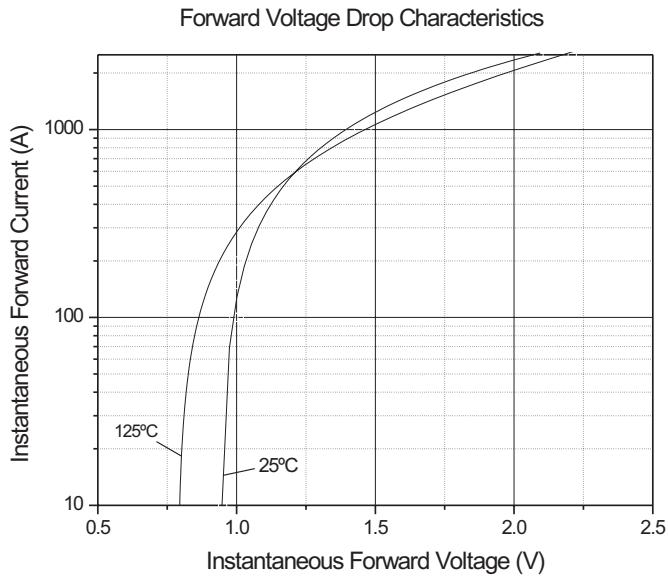
**Fig. 3 - On-state Power Loss Characteristics**



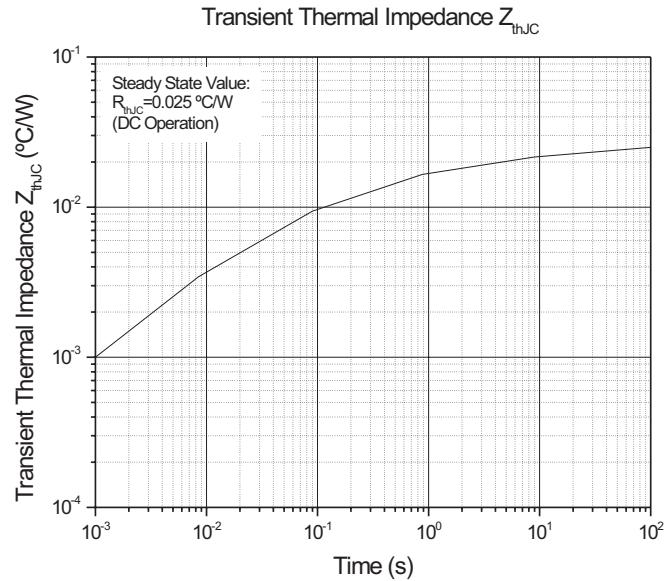
**Fig. 4 - On-state Power Loss Characteristics**



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**Fig. 5 - Forward Voltage Drop Characteristics**



**Fig. 6 - Transient Thermal Impedance  $Z_{thJC}$  Characteristics**

## TO-200AD

